L Number	Hits	Search Text	DB	Time stamp
-	543	(IP same (database list)) and encrypt$4 and @ad<=19990105	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/22 16:15
-	156	((IP same (database list)) and encrypt$4 and @ad<=19990105) and ((storage near device) MP3 (PC near peripheral))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/02 19:18
-	25	((IP same (database list)) and encrypt$4 and @ad<=19990105) and 713/$.ccls. and 380/$.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/02 17:05
-	226	(key near distribution) and @ad<=19990105 and 713/$.ccls. and 380/$.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/02 17:10
-	62	(((IP same (database list)) and encrypt$4 and @ad<=19990105) and ((storage near device) MP3 (PC near peripheral))) and subscriber	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/02 19:19
-	503	(authenticat$5 same (service near provider)) and @ad<=19990105	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/02 19:30
-	42	(authenticat$5 near (service near provider)) and @ad<=19990105	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2003/10/02 19:30
-	712	((certif$4 approv$4 trust$4) near (site website database))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/18 17:06
-	6	((certif$4 approv$4 trust$4) near (site website database)) and (download with notif$8) and (manufacturer vendor supplier)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/16 11:17
-	256	((certif$4 approv$4 trust$4) near (site website database)) and (manufacturer vendor supplier)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/16 16:16
-	6	((site website database)) near ((certif$4 approv$4 trust$4) near (manufacturer vendor supplier))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/16 16:17
-	114	((site website database)) same ((certif$4 approv$4 trust$4) near (manufacturer vendor supplier))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/16 16:47
-	59	((site website)) same ((approv$4 authentic$6 verif$9) near (vendor supplier))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/16 16:52
-	4	(("5757917") or ("5717989")).PN.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/17 14:06

-	102	"5757917"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/17 15:50
-	61	wintriss.in.	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/17 15:53
-	282	verification near (vendor source)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/17 15:54
-	2878	((authentic$6 verif$9) near (site website database))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/18 17:11
-	450	(380/$.ccls. OR 713/$.ccls.) and ((authentic$6 verif$9) near (site website database))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/18 17:08
-	13	((authentic$6 verif$9) near ((vendor manufacturer) near (site website database)))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/18 17:11
-	9	(download near multimedia) and @ad<=19990105	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/23 15:40
-	345	705/51 and @ad<=19990105	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/22 16:51
-	243	705/51.ccls. and @ad<=19990105	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/22 16:53
-	173	709/233.ccls. and @ad<=19990105	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/03/22 16:54

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(19) United States

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(54) METHOD AND APPARATUS FOR DISTRIBUTING MULTIMEDIA INFORMATION OVER A NETWORK

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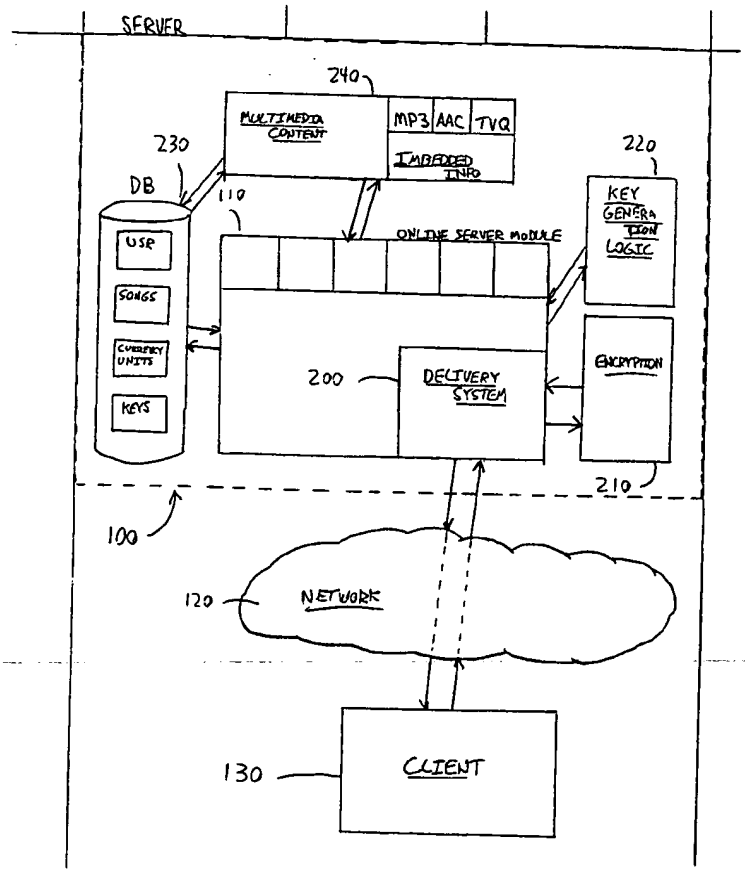
(57) ABSTRACT

A system and method of distributing music and video signals over a network is disclosed. In one embodiment a unique encryption key is generated based on who the user is and what content the user is requesting to download. When a user downloads a new music or video title, it is encrypted in a manner which no other users can decrypt. The encryption key needed to encrypt the digital music or video signal is stored on the client in an opaque format to prevent duplication and unauthorized playback. In another embodiment the user belongs to one or more subscription groups receives a subscription-based key. In another embodiment, electronic commerce units will be used to purchase music and video content. Also disclosed is a unique system and method for transferring digital multimedia content to one of a plurality of hardware players. In one embodiment the multimedia content is transferred to the hardware player in encrypted format. The multimedia content is then encrypted in the hardware player using a unique playback encryption key and a decryption module within the hardware player. In another embodiment the multimedia content is decrypted and then only a portion of the signal is re-encrypted before being transferred to the hardware player.



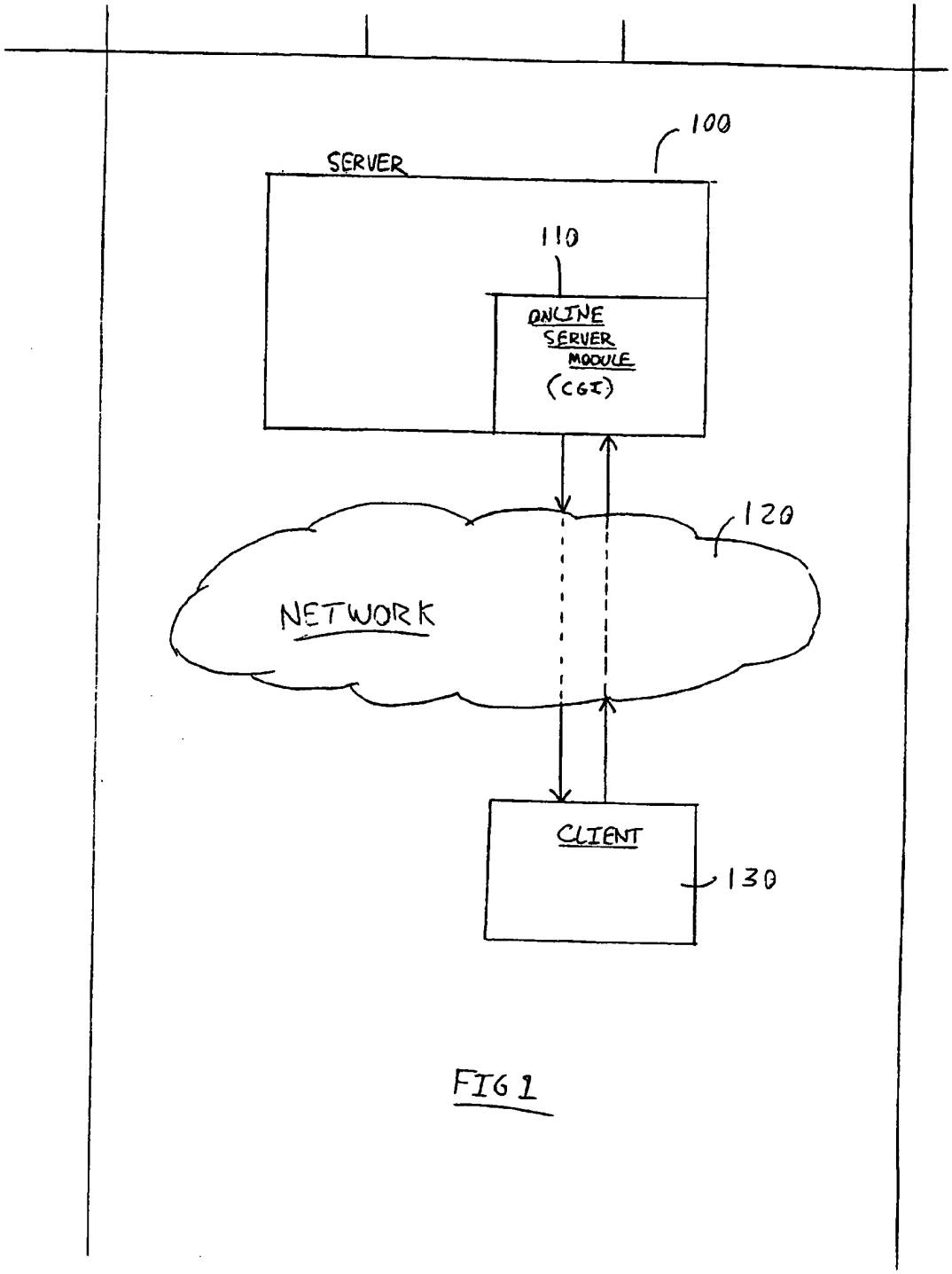

100
SERVER
110
ONLINE SERVER MODULE (CGI)
120
NETWORK
CLIENT
130

FIG 1

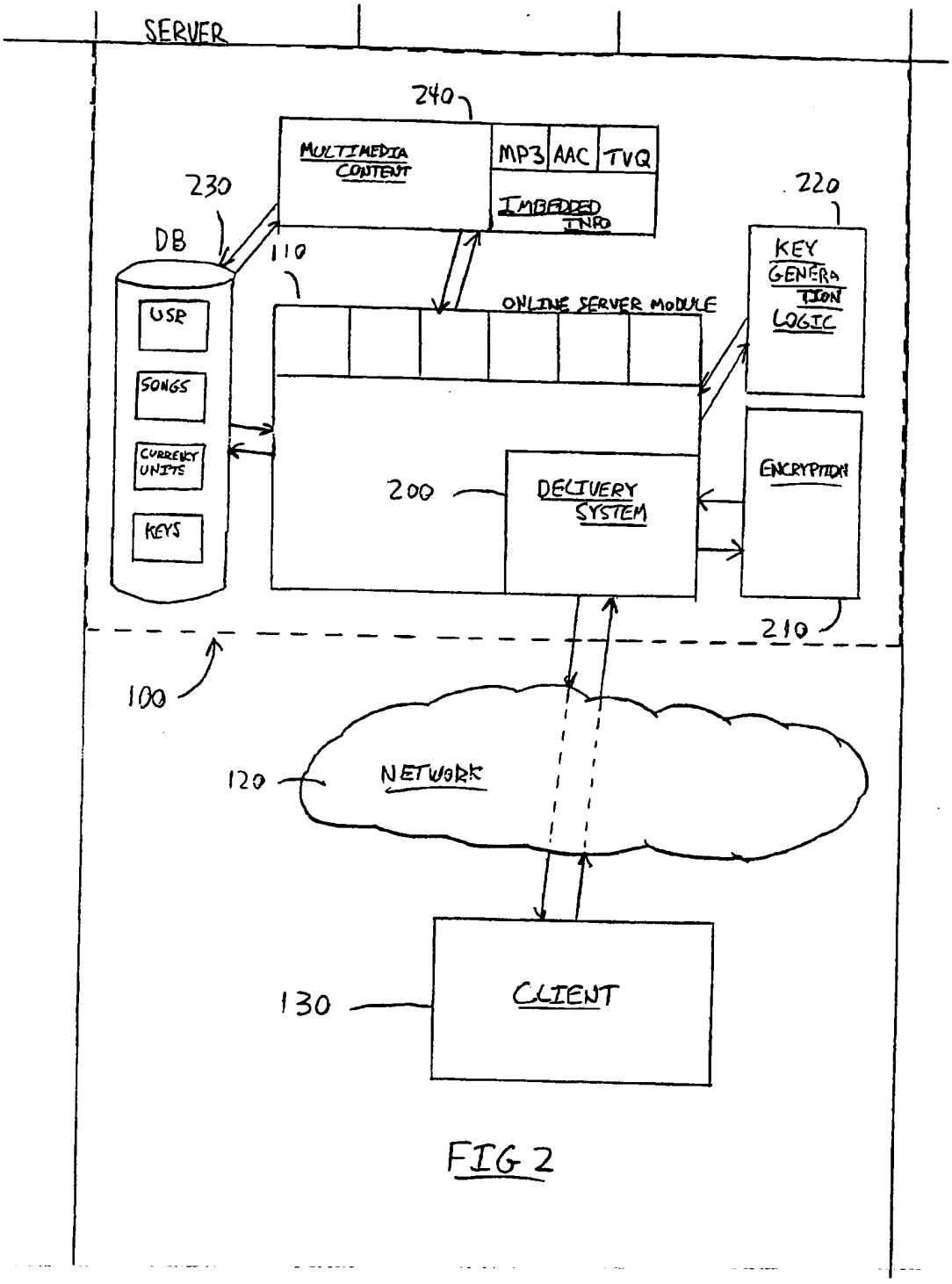

SERVER
240
MULTIMEDIA CONTENT
MP3
AAC
TVQ
IMBEDDED INFO
230
220
DB
110
KEY GENERATION LOGIC
ONLINE SERVER MODULE
USR
SONGS
CURRENT UNITS
KEYS
200
DELIVERY SYSTEM
ENCRYPTION
210
100
120
NETWORK
130
CLIENT

FIG 2

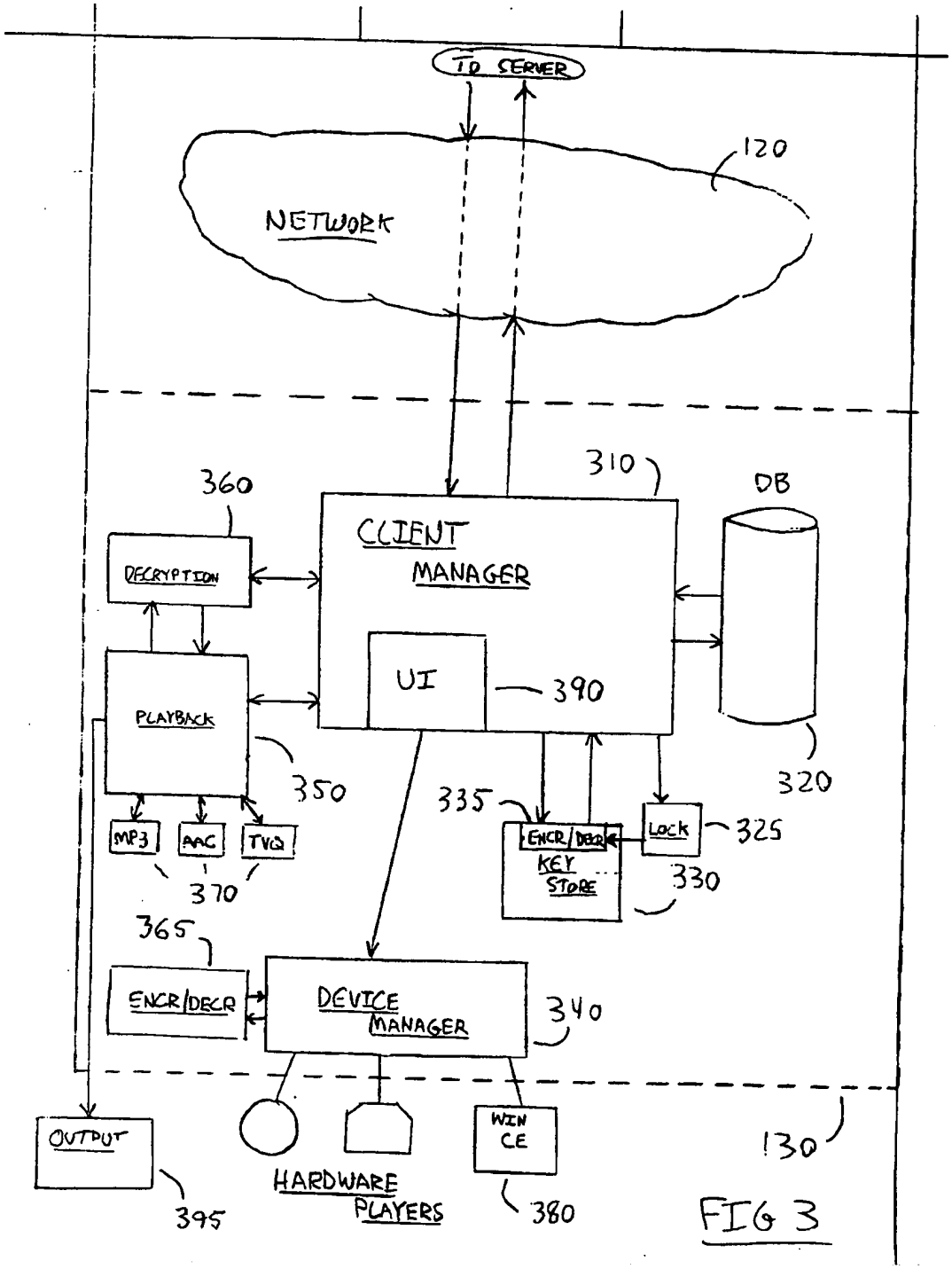
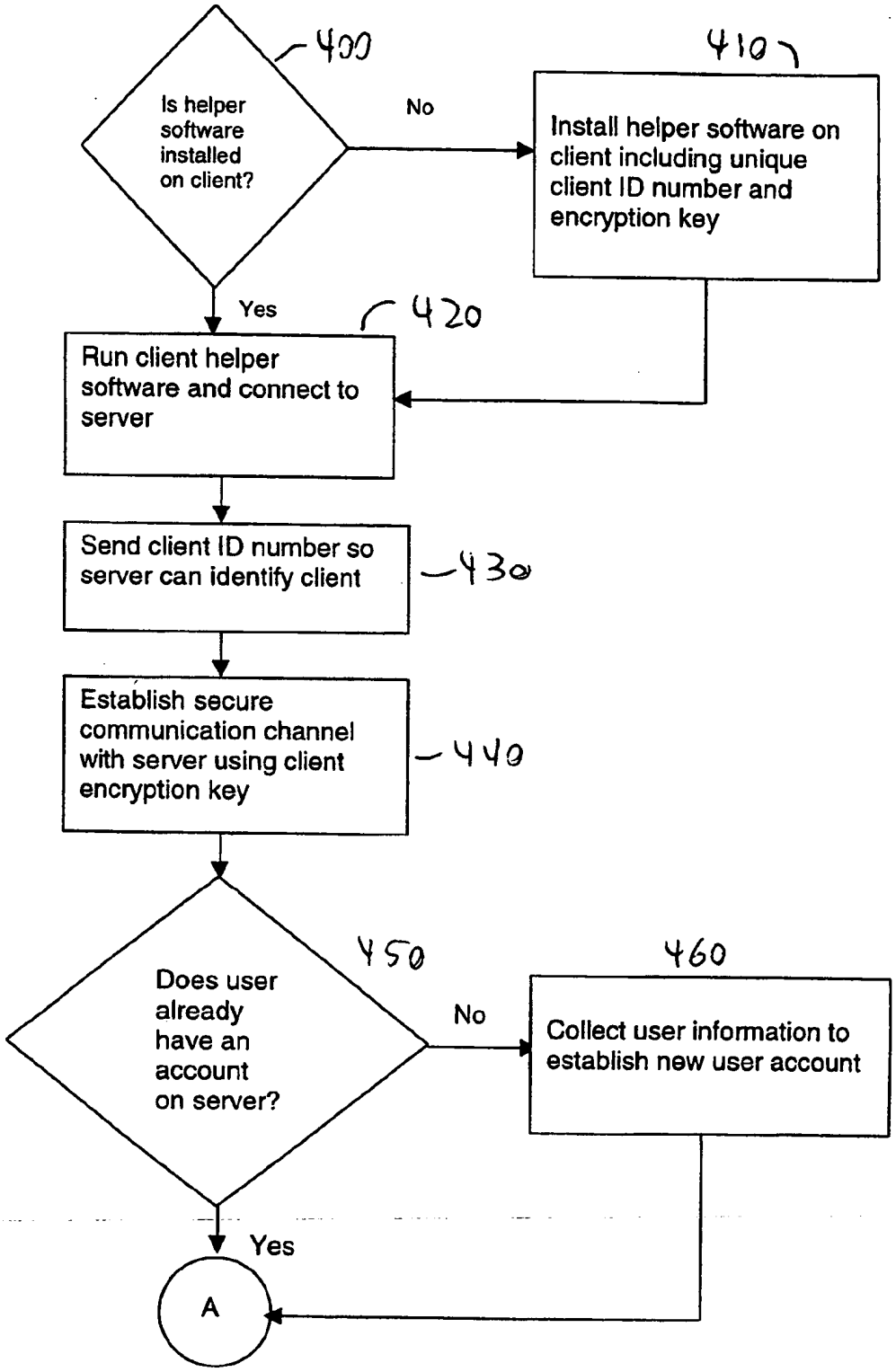
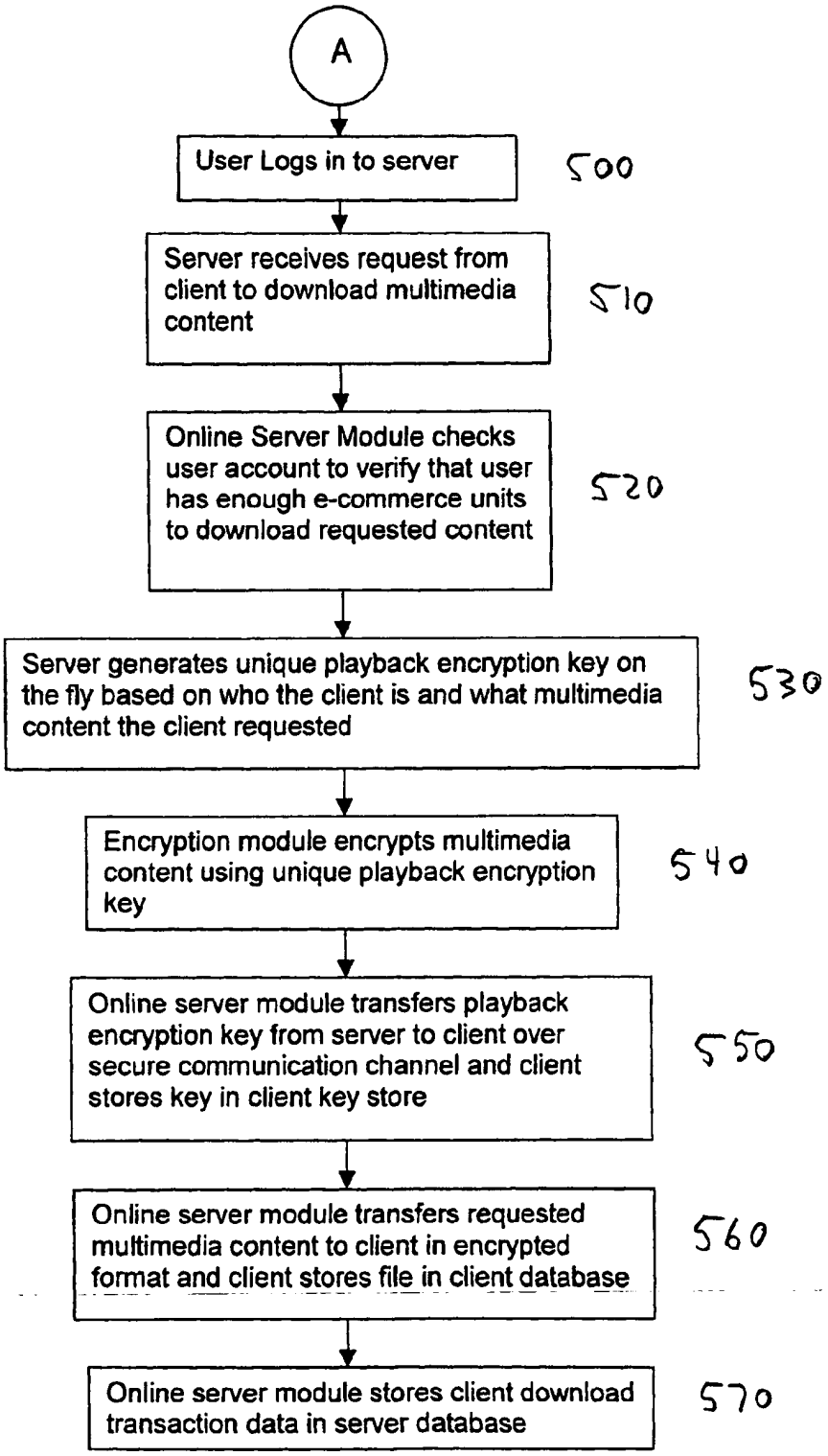

ID SERVER
120
NETWORK
360
310
DB
CLIENT MANAGER
DECRYPTION
UI
390
PLAYBACK
350
320
335
MP3
AAC
TVQ
370
ENCR/DECR
KEY STORE
Lock
325
330
365
ENCR/DECR
DEVICE MANAGER
340
OUTPUT
HARDWARE PLAYERS
WIN CE
130
395
380

FIG 3

Initial Setup – FIG 4



File Request and Download – FIG 5



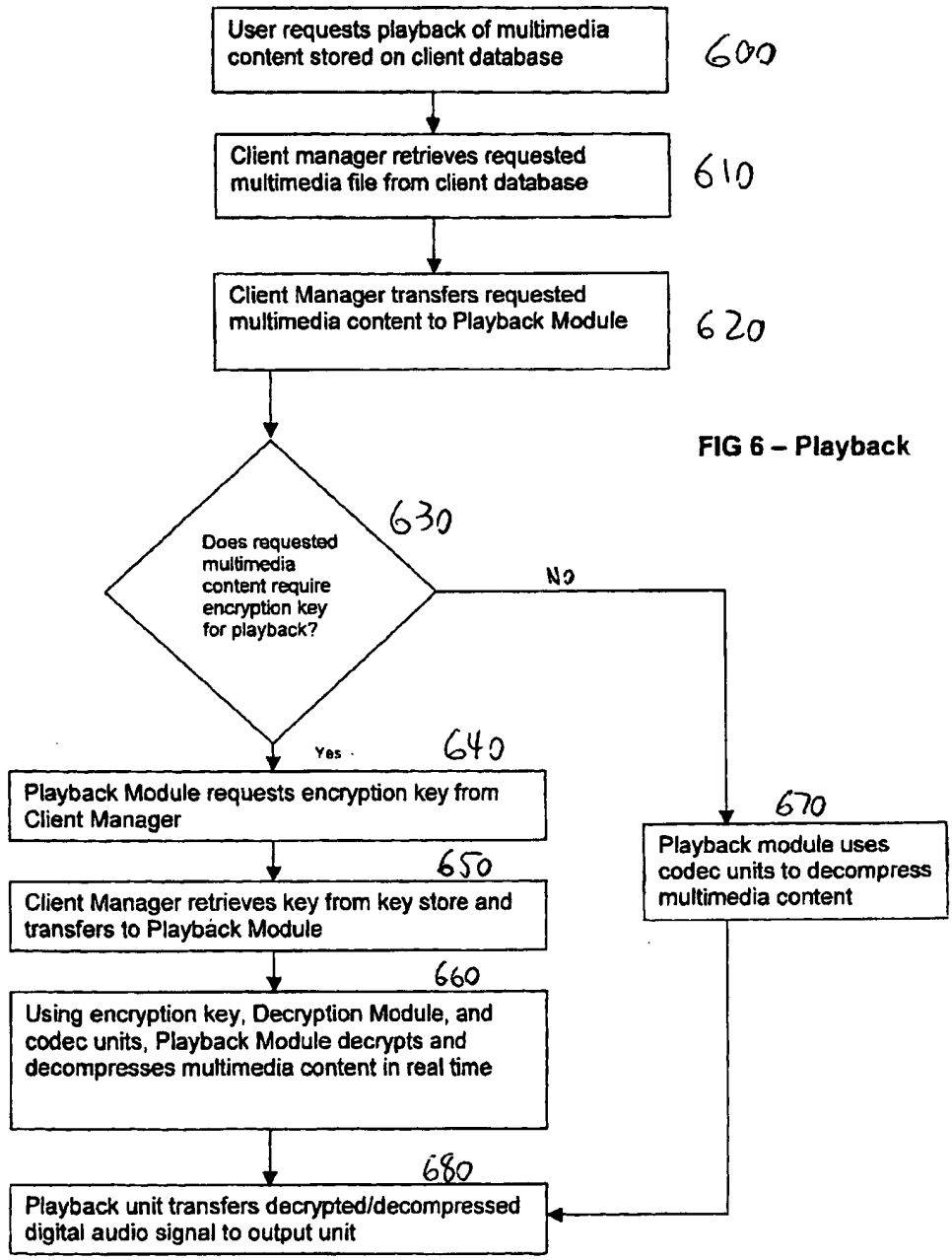


FIG 6 – Playback

FIG 7

Encryption Key Generation

	USER	CONTENT	ENCRYPTION KEY
700	User 1	Song X	Key X1
710	User 1	Song Y	Key Y1
720	User 2	Song X	Key X2
730	User 2	Song Y	Key Y2

FIG 8

Mass Distribution & Subscription-Based Key Generation

	USER	CONTENT	ENCRYPTION KEY
800	User 1	Song X (Jazz)	Jazz Key
810	User 1	Song Y (Jazz)	Jazz Key
820	User 2	Song Z (Country)	Country Key
830	User 3	Song P (Alternative)	Alternative Key
840	User 4	Song R (Classical)	Classical Key
850	User 2	Song T (Rock & Roll)	Rock & Roll Key
860	User 2	Song Q (Classical)	Classical Key

METHOD AND APPARATUS FOR DISTRIBUTING MULTIMEDIA INFORMATION OVER A NETWORK

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to the transmission of digital multimedia information across a computer network. More particularly, the present invention relates to a method and apparatus by which an end user may purchase and download digital audio and video content in an encrypted format.

[0003] 2. Description of the Related Art

[0004] Compact disks and magnetic tapes represent the two most common formats for distributing recorded music. Similarly, VHS cassettes and, more recently, digital video disks (hereinafter "DVDs") are two well known formats used to distribute video productions. There are numerous drawbacks associated with each of these music and video formats, however.

[0005] Analog storage formats such as magnetic tapes suffer from high distortion and low quality reproduction. Although digital storage formats such as compact disks and DVDs provide for higher quality music and video reproduction, these formats still suffer from the problem of degradation and damage over time. Additionally, to reach the consumer, music stored on these media must move through a relatively inefficient chain of distribution (i.e., manufacturer, retailer, and then end-user). Thus, a more efficient and reliable transfer mechanism for digital music and video is needed.

[0006] The distribution of music and video signals over a computer network provides a solution to all of the foregoing problems. As stated above, music and video signals found on compact disks and DVDs are stored in a digital format. This simply means that the underlying analog music and video signals are encoded into a signal comprised of a series of zeros and ones. Accordingly, personal computers which operate in a digital environment provide a natural medium for the retrieval, storage and manipulation of such signals. Up until recently, the mass distribution of music and video via computer networks (e.g., the Internet) was untenable because only a small percentage of consumers owned personal computers and, of the percentage that owned computers, an even smaller percentage were able to access a network. Today, however, personal computers have become pervasive in our society. Moreover, the percentage of computer users who have access to the Internet continues to grow each year at an exponential rate.

[0007] Although systems for downloading music and video over the Internet are currently in place, no satisfactory standards have been established. Moreover, because digital information is easily copied with a personal computer, the problem of unlawful duplication of music and video is an issue which has yet to be fully addressed. Thus, what is needed is a system and method for the mass distribution of music and video which will protect the copyright holders of the underlying music and video titles by ensuring that only those consumers who pay for the works have the ability to reproduce them. Accordingly, it is an objective of this invention to provide an improved encryption and playback system for music and video content downloaded off of a network. It is a further objective of this invention to establish an improved payment system for music and video purchases over a network.

SUMMARY OF THE INVENTION

[0008] The present invention relates to a system and method of distributing music and video signals over a network. When a user installs helper software on a client (e.g., a personal computer) a unique communication encryption key and a unique user ID are also installed. The communication encryption key is stored in an opaque format to prevent duplication. When the client initially connects to the server, the server identifies the client based on the unique user ID. Using this information, the server identifies the correct communication encryption key to use to open a secure communication channel with the client.

[0009] In one embodiment a unique encryption key is generated based on who the user is and what content the user is requesting to download. Thus, every time a user downloads a new music or video title, it is encrypted in a manner which no other users can decrypt. The encryption key needed to encrypt the digital music or video signal is stored on the client in an opaque format to prevent duplication and unauthorized playback.

[0010] In another embodiment the user belongs to one or more subscription groups. Once signed up with a particular subscription group, the user will receive a subscription-based key. When the user attempts to download a music or video title which is categorized under a subscription to which the user belongs, the title will be encrypted using the subscription-based key.

[0011] In another embodiment electronic commerce units are used to purchase music and video content. The server will check its database to determine whether the user has sufficient electronic commerce units to download the requested music or video content. When the user initially establishes an account he may be assigned an electronic commerce card which provides him a set number of electronic commerce units. Alternatively, the user may be assigned an electronic commerce card with a predetermined number of electronic commerce units before the user establishes an account on server. The user can then acquire additional electronic commerce units through, for example, music company promotions, or he can purchase additional units.

[0012] Also disclosed in one embodiment is a unique system and method for transferring digital multimedia content to one of a plurality of hardware players. In one embodiment the multimedia content is transferred to the hardware player in encrypted format. The multimedia content is then encrypted in the hardware player using a unique playback encryption key and a decryption module within the hardware player. In another embodiment the multimedia content is decrypted and then only a portion of the signal is re-encrypted before being transferred to the hardware player.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] A better understanding of the present invention can be obtained from the following detailed description in conjunction with the following drawings, in which:

[0014] **FIG. 1** illustrates generally an embodiment of the recited claims including a data network through which a client and server communicate.

[0015] **FIG. 2** illustrates an embodiment of the server of **FIG. 1** in greater detail.

[0016] **FIG. 3** illustrates an embodiment of the client of **FIG. 1** in greater detail.

[0017] **FIG. 4** is a flow diagram illustrating an initial setup procedure.

[0018] **FIG. 5** is a flow diagram which sets forth a file request and download procedure.

[0019] **FIG. 6** is a flow diagram which sets forth a playback procedure.

[0020] **FIG. 7** is table illustrating encryption key generation generally.

[0021] **FIG. 8** is a table illustrating mass-distribution and subscription-based encryption key generation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0022] **FIG. 1** generally depicts an embodiment the present system and method for distributing music and video (i.e., multimedia) information. One or more clients **130** connect to a server **100** over a data network **120**. The client **130** may be a consumer running a personal computer and connecting to server **100** via the Internet **120**. The server in one embodiment is a computer system upon which an online server module **110**, generally a common gateway interface program (hereinafter "CGI"), is executed to communicate with client **130**. In a preferred embodiment of the recited system, both the server **100** and the client **130** are networked computers each comprising a processor and a memory with which software implementing the network functionality of the present invention is executed. This functionality is described below.

[0023] One of ordinary skill in the art will readily recognize from the following discussion that, depending on the system configuration, different types of servers, clients and software could be employed without departing from the underlying principles of the present invention. Moreover, while the embodiment discussed below uses an Internet connection for communication between client **130** and server **100**, other communication schemes such as a direct connection to server **100**, etc., could be implemented as well.

[0024] **FIG. 2** illustrates server **100** in greater detail. Online server module **110** of server **100** communicates to client **130** via delivery system **200**. Included in sever **100** is an encryption module **210** for encrypting communication between client **130** and server **100**. Additionally, server **100** includes key generation logic **220** for generating keys used by online server module **110** and client **130** as described herein. Server **100** also includes a database unit, typically residing on one or more hard disk drives. In one embodiment database **230** is a relational database used to store information used by online server module **110** to store music and video content as well as information about client **130**. As described below, music and video content are stored in database **230** in a unique file format **240**. In one embodiment a single digital music file will contain additional information related to the musical composition. For example, the lyrics of the song, the underlying musical score, pictures, video and other information about the orchestra or band (e.g., upcoming tour dates) will be imbedded into the digital file format. Additionally, when a user downloads multimedia content from server **100** as described below an identification number associated with the purchaser will be appended to the file format **240**. This number will be used to identify the owner of the multimedia content.

[0025] **FIG. 3** illustrates client **130** in greater detail. Client helper software installed on client **130** includes client manager module **310**, playback module **350**, codec units **370**, encryption/decryption modules **360** and **365**, key store **330**, key store lock **325** and device manager **340**. Client **130** communicates to server **100** via client manager **310**. Client also includes a database **320** for storing music and video content previously downloaded from server **100** as well as configuration information for client manager **310**. Playback module **350** is used by client manager **310** to reproduce music and video content downloaded from server **100**. Playback module **350** operates (as described in more detail below) in conjunction with decryption module **360** to decrypt content encrypted by server **100**. Key store **330** includes encryption keys needed by playback module **350** and decryption module **360** in the decryption process. Key store **330** is hidden on client **130** in an opaque digital format as described below to prevent the copying of user keys from key store **330**. This reduces the possibility of unlawful reproduction of music and video content by an unregistered user. In other words, if the key store **330** was easily accessible, a user could simply copy keys from key store **330** (e.g., to a floppy disk) and thereby allow other users access to the decrypted music and video content.

[0026] Playback module **350** communicates with codec units **370** to decompress music and video content before playback. In an alternative embodiment codec units **370** are incorporated within playback module **350**. As is well known in the art, the use of compression algorithms to compress digital audio and video signals significantly decreases the storage space required to store such signals. For example, using the well known MP3 compression standard for audio signals, a compression ratio of 12:1 can be achieved with virtually no loss in sound quality. Thus, when a 5 megabyte digital music file is compressed using Motion Picture Experts Group Standard, 3rd version (MPEG-3 or MP3) it will take up less than ½ megabytes of hard drive space. This is significant not only in terms of saving hard drive space but also in terms of the time required for client **130** to download music and video content. This is particularly true if client **130** is connecting to server **100** over a typical dial-up modem connection through network **120** (over which the fastest speed possible is approximately 53,000 bits/second). Another compression standard known in the art is "Advanced Audio Coding" (ACC). In a preferred embodiment client manager software **310** will be upgradeable so that when new compression standards are established in the industry, users registered on server **100** will automatically receive an update of their helper software on client **130** which includes the new decompression codec units **370**.

[0027] Output module **395** receives the decompressed and decrypted music or video signal (possibly in analog format) and completes the reproduction of the signal. Thus, in the case of music content, output module **395** might simply consist of a speaker system. In the case of video reproduction, output module **395** might consist of a video monitor and a speaker system.

[0028] Device manager **340** communicates to client manager **310** through user interface **390**. In one embodiment device manager **340** receives music content from client manager **310** in encrypted format and transfers the encrypted content to a memory (e.g., flash memory) within one or more portable music players **380**. An example of such a portable music player is the Rio pmp300 from Diamond Multimedia Systems, Inc. In another embodiment the portable music player is a device running the Windows CE® operating system configured to decrypt and decompress the multimedia content. Windows CE® is developed by Microsoft Corp., Redmond, Wash.

[0029] Transferring the digital music signal in encrypted format prevents unlawful duplication of the music content by users who do not have a right to reproduce (i.e., have not purchased) the content. Thus, in order to decrypt the encrypted music format, in one embodiment of the recited claims, portable music players **380** contain a subset of client helper software described herein including a playback module **350**, codec units **320**, a decryption module **360** and a key store **330**.

[0030] In another embodiment client manager **310** sends the digital music signal to device manager **340** after decrypting the signal using decryption module **360**. Device manager **340** then re-encrypts the signal using encryption module **365**. Because hardware players currently do not have the same level of processing power as a typical client **130** (e.g., a personal computer with a 400 MHz Pentium processor) it may be beneficial to use a less processor-intensive encryption algorithm. For example, instead of encrypting the entire underlying signal, device manager **340** may use encryption module **365** to encrypt every 10^{th} byte of the signal. Accordingly, the playback encryption key for the music content stored in key store **330** can be used by encryption module **365**, but only a portion of the underlying signal will be encrypted. In one embodiment, encryption module **360** and encryption module **365** are the same module (but used in a different manner by playback module **350** and device manager **340**.

[0031] Referring now to **FIGS. 4, 5,** and **6**, the operation of the present invention will be described in greater detail. **FIG. 4** is a flow chart illustrating the initial setup procedure of helper software on client **130**. In a preferred embodiment, a potential user will download a copy of the helper software used on client **130** from the server **100** over network **120**, or possibly from a different server (e.g., a world-wide-web server). Alternatively, user can call and request a copy of the helper installation software on compact disk, floppy disk, or DVD format.

[0032] If helper software is already installed on client **130** (step **400**) the next step will be to run the software and connect to server **100** (step **420**). However, if the helper software is not yet installed, it will be installed on client **130** at step **410**. When helper software is installed at step **410**, a unique client ID number and communication encryption key are assigned to client **130**.

[0033] Once helper software has been installed on client **130** and client **130** has established communication with server **100** (step **420**), client manager **310** sends the client ID number to online server module **110** which online server module **110** uses to identify client **130**. Once online server module **110** identifies client **130** using the unique ID number, online server module **110** is then able to automatically identify the communication encryption key that it needs to use to establish a secure communication channel with client **130**. It is important to establish a secure communication channel between client **130** and server **100** across network **120** because network **120** is generally an unsecure environment. That is, confidential communications and other transmissions (e.g., credit card numbers) can be intercepted by other clients on network **120**. Thus, by using a communication encryption key to encrypt communications, if the encrypted data is received by other users on network **120** they will not be able to decrypt it without the encryption key. For this reason, in the present embodiment online server module **110** identifies the correct communication encryption key using the client ID number, rather than sending a communication encryption key across the network **120**. That is, if server **100** was required to communicate an encryption key over network **120** to establish a secure communication channel with client **130**, other users could intercept the communication encryption key and use it to decrypt the confidential communications between server **100** and client **130**.

[0034] Once a secure communication channel has been established at step **440**, the next step is to determine whether the user connecting from client **130** is already set up with an account on server **100**. For example, a particular user could have initially established an account from an office computer and could now be attempting to connect to server **100** from a home computer. If the user has not established an account on server **100**, the user will be prompted to submit information in order to establish an account (e.g., name, address, telephone number, billing information, etc.). Once the user has input the required account information, online server module **110** creates a user data object to be stored in database **230** which contains information about the user. The user data object includes a client manager ID as well as a user ID. Online server module **110** uses the client manager ID to identify which client **130** the user is connecting from (assuming that the user connects from more than one client). The user data object also includes the user's login name and password.

[0035] Referring now to **FIG. 5**, once an account has been established on server **100**, the next time the user attempts to connect to server **100** from client **130**, he will be prompted to log in using his login name and password (step **500**). Once logged in, the user can then browse through a directory of audio and video content. A user may also sign up for a particular subscription group. For example, in one embodiment when the user initially signs up he will be asked about the type of music which he prefers. He will then be added to a subscription group comprised of songs which fall under that particular musical category (e.g., Jazz, Classical, Alternative, etc.). Then, when the user logs on he will be shown primarily subscription-based musical content.

[0036] When the user decides to purchase a particular song or video, client manager **310** will send a request to online server module **110** of server **100** (step **510**). Online server module **110** will then check database **230** to determine whether the user has sufficient electronic commerce units, known in the present system as "Mjuice™" units, to download the requested music or video content. Mjuice™ units can be acquired in a number of ways. For example, when the user initially establishes an account on server **100**

he may be assigned an Mjuice™ card which provides him an initial number of Mjuice™ units. Alternatively, the user may be assigned an Mjuice™ card with a predetermined number of Mjuice™ units before the user establishes an account on server **100**. Server **100** would identify the card based on an Mjuice™ card identification number hard-coded on the card. Once the user has established an account, he will instantly have a predetermined amount of Mjuice™ credit towards purchasing music and video content on server **100**.

[0037] The user can then acquire additional Mjuice™ units through, for example, music company promotions, or he can purchase additional units over network **120**. In one embodiment the payment for Mjuice™ units is separate from the selection and download of music content. That is, if a user required additional Mjuice™ units to purchase multimedia content, he will be redirected to an e-commerce server where he can use his credit card to pay for additional units. The e-commerce server will then communicate with server **100** and server **100** will update the user's account with the additional Mjuice™ units.

[0038] Once online server module **110** determines that the user has sufficient Mjuice™ units to download the requested content, online server module **110** communicates with key generation logic **220** to generate a unique playback encryption key for the requested content based on who the user is and the content requested by the user. In an alternative embodiment key generation logic **220** is incorporated within online server module **110**. It should be noted that the playback encryption key generated at step **530** is different from the communication encryption key generated at step **440** of **FIG. 4**. The communication encryption key at step **440** is used to encrypt all communications between online server module **110** and client manager **310** to establish a secure communication channel. By contrast, the playback encryption key generated at step **530** is used by encryption module **210** to encrypt specific music and video content (step **540**) which will be subsequently downloaded and stored on client database **320** so that the user can play back the content at a later time.

[0039] **FIG. 7** is a table which will help illustrate the operation of key generation logic **220**. As shown in the table at row **700**, if User **1** requests Song X (and if Song X is not categorized under a subscription group to which User **1** belongs as described below), key generation logic **220** will generate a unique playback encryption key X1 based on Song X and User 1. This will be the only key that can be used to play back this encrypted version of Song X. If User 2 requests Song X, key generation logic **220** will generate a different playback encryption key (key X2). Similarly, if User **1** requests Song Y, key generation logic will generate playback encryption key Y1.

[0040] At step **550**, delivery system **200** of online server module **110** will transfer the playback encryption key X1 to client manager **310** over the secure communication channel. Client manager **310** will then store playback encryption key X1 in key store **330**. As described above, key store **330** will store the playback encryption key in an opaque format so that it cannot easily be extracted from key store. This will prevent unlawful duplication of playback encryption key X1 and encrypted Song 1 by a potential copyright infringer.

[0041] As shown in **FIG. 3**, in one embodiment of the recited claims key store **330** is hidden using a key store encryption module **335**. Each installation of client helper software includes a unique key store lock **325** used to encrypt and decrypt the keys stored in key store **330**. In other words, the key store, which contains unique playback encryption keys, is itself encrypted to prevent unlawful duplication of the playback encryption keys, using a unique key store lock **325**. The additional encryption step is implemented as a supplementary defense against unlawful reproduction of the underlying multimedia works.

[0042] At step **560** online server module transfers the encrypted multimedia content (e.g., encrypted Song **1**) to client manager **310** and client manager **310** stores the content in database **320**. It should be noted that steps **550** and **560** can take place in reverse order. That is, the delivery system **200** of online server module **110** could transmit the requested multimedia content to client manager **310** before transmitting the encryption key.

[0043] At step **570**, online server module **110** stores User **1**'s download transaction (i.e., the download of Song X) in server database **230**. This includes storage of the unique playback encryption key generated at step **530**. In this way, server **100** keep track of all of User **1**'s transactions and all of User **1**'s encryption keys. Accordingly, if User 1 loses any or all of his downloaded music or video content (e.g., through failure of database **320** on client **130**) he can simply request to re-download all of the content from server database **230**. This enables a user of client **130** to develop and extensive music and video database without the need to continual backups of client database **320**.

[0044] Referring now to **FIG. 8**, in another embodiment the same encryption key can be used by different users. For example, if User **1** signed up on server **100** with a "Jazz" subscription group, and if Song X was a jazz title, then (at step **530**) the encryption key generated by key generation logic **220** would be a subscription-based Jazz encryption key. In one embodiment of the recited claims subscription-based keys, once generated, are stored in database **230** for later use by other members of the subscription group.

[0045] Thus, as shown in rows **800** and **810** of **FIG. 8**, both User **1** and User **2** would download the same encryption key for playback of Song X and Song Y, respectively. Similarly, referring to rows **840** and **860**, if User **4** and User **2** were registered on server **100** as part of a "Classical" subscription group, and if Songs R and Q were classical titles, then both songs would be encrypted (by online server module **110** and encryption module **210**) using the same "Classical" encryption key. If User **4** did not belong to a classical subscription group, however, and still requested to download Song R (as shown in row **840**), then a unique encryption key—e.g., Key R4—would be generated by key generation logic **220**. Accordingly, a flexible method and system is disclosed for transmitting music and video content while still protecting the rights of the copyright holders.

[0046] Referring now to **FIG. 6**, the playback of multimedia content by client **130** will be described. At step **600** a user initially requests playback of music or video content stored in client **130**. Next, at step **610**, client manager **310** retrieves the requested content from database **320** and, at step **620**, transfers the requested content to playback module **350** for playback. At step **630** playback module determines whether the requested multimedia content requires an encryption key for playback. Under some circumstances no

decryption of a video or music title may be required. For example, for works which are no longer protected by copyright (e.g., if the copyright has expired) there is no reason to require encryption. In one embodiment the playback module examines the data header of the requested music file to determine whether encryption is required. If compression is not required, then at step **670** playback module uses codec units **370** to decompress the multimedia content in real time.

[0047] If decryption is required, however, then playback module **350** requests the necessary encryption key from client manager **310** at step **640**. In one embodiment playback module determines which key is required based on a key identification code located in the data header of the requested music or video file. At step **650**, client manager retrieves the necessary encryption key from key store **650** and transfers the key to playback module **350**.

[0048] Playback module then uses the encryption key, decryption module **360** and codec units **370** to decrypt and decompress the multimedia content in real time at step **660**. To accomplish the decryption/decompression process in real time, playback module sends portions (e.g., 64-bytes) of the encrypted/compressed multimedia content through decryption module which uses the playback encryption key to decrypt the portions of multimedia content. Then playback module **350** sends the decrypted portions of the multimedia content through codec units **370** where the decrypted portions of multimedia content are decompressed. As stated above, using compression algorithms to compress and decompress digital music or video content is well know in the art. Thus, playback module is able to reconstruct the underlying multimedia signal in real time by decrypting and decompressing the multimedia content piece by piece, instead of first decrypting and then decompressing the entire underlying signal.

[0049] Finally, after the music or video content has been decrypted and decompressed, playback unit **350** sends the decrypted/decompressed digital signal to output unit **395** (step **680**). In one embodiment output unit includes an A/D converter to convert the digital signal to analog and also includes components necessary to reproduce the underlying analog signal. For example, if the underlying signal is music, then a speaker system is used to reproduce the signal; if the underlying signal is video, then a video monitor is used. The concepts of A/D conversion and reproduction of the underlying analog signal are well known to those of skill in the art.

What is claimed is:

1. A method for distributing multimedia content from a server to a client over a network comprising the steps of:

generating a playback encryption key to encrypt the multimedia content, the playback encryption key generated based on the identity of the client and the multimedia content requested by the client;

encrypting the multimedia content at the server using the playback encryption key; and

sending the encrypted multimedia content from the server to the client.

2. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 including the initial step of establishing a secure communication channel between the client and the server using a communication encryption key.

3. The method for distributing multimedia content from a server to a client over a network as claimed in claim 2 wherein the secure communication channel is established without the server or client sending the communication encryption key across the network.

4. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 wherein the playback encryption key is generated based on a subscription group to which the client belongs.

5. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 wherein the server distributes the multimedia content to the client only if the client has sufficient electronic commerce units stored on server.

6. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 wherein communication between the client and the server is accomplished through a common gateway interface module ("CGI") executed on the server.

7. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 wherein the multimedia content is music content.

8. The method for distributing multimedia content from a server to a client over a network as claimed in claim 7 wherein the music content includes additional information about the composer of the music.

9. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 wherein the multimedia content is compressed using a compression codec.

10. The method for distributing multimedia content from a server to a client over a network as claimed in claim 9 wherein the compression codec used to compress the multimedia content is the MP3 compression codec.

11. The method for distributing multimedia content from a server to a client over a network as claimed in claim 2 where the server periodically generates a new communication encryption key.

12. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 wherein the playback encryption key is stored on the client in an opaque format.

13. The method for distributing multimedia content from a server to a client over a network as claimed in claim 7 including the additional step of transferring the multimedia content from the client to a portable music player.

14. The method for distributing multimedia content from a server to a client over a network as claimed in claim 13 wherein the multimedia content is transferred to the hardware music player in an encrypted format.

15. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 wherein the server stores all of the multi media content downloaded by the client and of all encryption keys needed by the client to decrypt the multimedia content.

16. The method for distributing multimedia content from a server to a client over a network as claimed in claim 15 including the step of the server transferring all previously downloaded multimedia content to the client.

17. The method for distributing multimedia content from a server to a client over a network as claimed in claim 1 including the step of the server determining whether the client has sufficient electronic commerce units to download the requested multimedia content.

18. The method for distributing multimedia content from a server to a client over a network as claimed in claim 17 wherein the electronic commerce units are assigned to client before client establishes an account on the server by way of a pre-paid music card.

19. The method for distributing multimedia content from a server to a client over a network as claimed in claim 18 wherein the client communicates an identification number printed on the pre-paid music card to server to identify the pre-paid music card being used.

20. A method for distributing multimedia content from a server to a client over a network comprising the steps of:

receiving multimedia content from a server, the multimedia content encrypted using a unique playback encryption key generated based on the identity of the client and the multimedia content;

storing the playback encryption key in a key store; and

decrypting the multimedia content using the playback encryption key.

21. The method for distributing multimedia content as claimed in claim 20 wherein the key store is encrypted to prevent duplication of the playback encryption keys stored therein.

22. The method as claimed in claim 20 including the step of decompressing the multimedia content.

23. The method as claimed in claim 20 wherein the multimedia content received from the server is received over a secure communication channel using a communication encryption key.

24. The method as claimed in claim 23 wherein the secure communication channel is established without the server or client sending the communication encryption key across the network.

25. The method as claimed in claim 24 wherein the server identifies the communication encryption key based on a client identification number

26. The method as claimed in claim 20 wherein the encrypted signal and the playback encryption key are transmitted to one of a plurality of hardware music players.

27. The method as claimed in claim 20 including the additional steps of:

re-encrypting the decrypted multimedia signal using the playback encryption key; and

transmitting the re-encrypted multimedia signal and the playback encryption key to one of a plurality of hardware music players.

28. The method as claimed in claim 27 wherein only a portion of the multimedia signal is re-encrypted.

29. A server having a processor and a memory coupled to the processor, the memory having stored therein sequences of instructions which, when executed by the processor, cause the processor to perform the steps of:

generating a playback encryption key to encrypt multimedia content, the playback encryption key generated based on the identity of a client and the multimedia content requested by the client;

encrypting the multimedia content at the server using the playback encryption key; and

sending the encrypted multimedia content from the server to the client.

30. The server as claimed in claim 29 wherein the server initially establishes a secure communication channel with the client using a communication encryption key.

31. The server as claimed in claim 30 wherein the secure communication channel is established without the server or client sending the communication encryption key across the network.

32. The server as claimed in claim 29 wherein the server distributes the multimedia content to the client only if the client has sufficient electronic commerce units recorded on the server.

33. The server as claimed in claim 29 wherein the multimedia content is compressed using a compression codec.

34. A computer data signal embodied in a carrier wave for distributing multimedia content from a server to a client over a network comprising:

a first source code segment for generating a playback encryption key to encrypt the multimedia content, the playback encryption key generated based on the identity of the client and the multimedia content requested by the client;

a second source code segment for encrypting the multimedia content at the server using the playback encryption key; and

a third source code segment for sending the encrypted multimedia content from the server to the client.

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